

facilitated by said homologous recombination of the flanking sequences with the complementary sequences in the target chloroplast genome, wherein said stable integration is not directed into a transcriptionally inactive region of the chloroplast genome, said vector comprising a heterologous nucleotide sequence coding for a selectable phenotype wherein the flanking sequences comprise, each one a portion of the intergenic spacer 2 region between the tRNA<sup>Ile</sup> and the tRNA<sup>Ala</sup> genes of the chloroplast genome of a higher plant, which plant is the same as or different from the target higher plant, whereby double homologous recombination with the conserved spacer 2 region in the target plant chloroplast genome is facilitated.

5.17 190. (Twice Amended) A universal integration and expression vector competent for stably transforming the chloroplast genome of higher plant species which comprises an expression cassette which comprises, operably joined, a heterologous DNA sequence coding for a peptide of interest and control sequences positioned upstream from the 5' and downstream from the 3' ends of the coding sequence to provide expression of the coding sequence in the chloroplast genome of a target higher plant, and flanking each side of the expression cassette, chloroplast DNA sequences which originate from a plant species different from the target plant, said chloroplast sequences being conserved in all higher plants and complementary to the corresponding chloroplast sequences of the target plant, which chloroplast sequences are also competent <sup>or</sup> to undergo homologous recombination with said complementary sequences, whereby stable integration of the heterologous coding sequence into the chloroplast genome of the target plant is facilitated by said homologous recombination of the flanking sequences with the complementary sequences in the target chloroplast genome, and wherein said stable integration is directed into a transcriptionally active polycistronic spacer region of the chloroplast genome.

✓ basis 191. (Twice Amended) A universal integration and expression vector competent for stably transforming the chloroplast genome of higher plant species which comprises an

expression cassette which comprises, operably joined, a heterologous DNA sequence coding for a peptide of interest and control sequences positioned upstream from the 5' and downstream from the 3' ends of the coding sequence to provide expression of the coding sequence in the chloroplast genome of a target higher plant, and flanking each side of the expression cassette, flanking DNA sequences which originate from a plant species different from the target plant, said flanking sequences being conserved in all higher plants and complementary to the corresponding chloroplast sequences of the target plant, which flanking sequences are also competent to undergo homologous recombination with said complementary sequences of the target plant which are homologous to a spacer sequence of the target chloroplast genome, which sequence is conserved in the chloroplast genome of different plant species, whereby stable integration of the heterologous coding sequence is facilitated through homologous recombination of the flanking sequences with the homologous sequences in the target chloroplast genome into a transcriptionally active polycistronic spacer region of the chloroplast genome of the target plant.

192. (Twice Amended) A universal integration and expression vector competent for stably transforming the chloroplast genome of higher plant species which comprises an expression cassette which comprises, operably joined, a heterologous DNA sequence coding for a peptide of interest and control sequences positioned upstream from the 5' and downstream from the 3' ends of the coding sequence including a transcription termination region to provide expression of the coding sequence in the chloroplast genome of a target higher plant, and flanking each side of the expression cassette, flanking DNA sequences which originate from a plant species different from the target plant, said flanking sequences being conserved in all higher plants and complementary to the corresponding chloroplast sequences of the target plant, which flanking sequences are also competent to undergo homologous recombination with said complementary sequences of the target plant which are homologous to a spacer sequence of the target chloroplast genome, which sequence is conserved in the chloroplast genome of different

plant species, whereby stable integration of the heterologous coding sequence is facilitated through homologous recombination of the flanking sequences with the homologous sequences in the target chloroplast genome into a transcriptionally active polycistronic spacer region of the chloroplast genome of the target plant.

Sub F2 193. (Twice Amended) A universal integration and expression vector competent for stably transforming the chloroplast genome of higher plant species which comprises an expression cassette which comprises, operably joined, a heterologous DNA sequence coding for a peptide of interest and control sequences positioned upstream from the 5' and downstream from the 3' ends of the coding sequence to provide expression of the coding sequence in the chloroplast genome of a target higher plant, and flanking each side of the expression cassette, flanking chloroplast DNA sequences each one a portion of a synthetic spacer 2 region between the tRNA<sup>Ile</sup> and tRNA<sup>Ala</sup> genes, said chloroplast sequences being conserved in all higher plants and complementary to the corresponding chloroplast sequences of the target plant, which chloroplast sequences are also competent to undergo homologous recombination with said complementary sequences of the target plant which are homologous to a spacer sequence of the target chloroplast genome, which sequence is conserved in the chloroplast genome of different plant species, whereby stable integration of the heterologous coding sequence into the chloroplast genome of the target plant is facilitated through homologous recombination of the flanking sequences with the homologous sequences in a transcriptionally active polycistronic spacer region of the target chloroplast genome.

Sub F3 196. (Twice Amended) A process for stably transforming higher target plant species which comprises introducing a universal integration and expression vector into the chloroplast genome of the target plant species and allowing the transformed plant to grow, the vector being competent for stably transforming the chloroplast genome of higher plant species which comprises an expression cassette which comprises, operably joined, a heterologous DNA

sequence coding for a peptide of interest and control sequences positioned upstream from the 5' and downstream from the 3' ends of the coding sequence to provide expression of the coding sequence in the chloroplast genome of a target higher plant, and flanking each side of the expression cassette, flanking DNA sequences which originate from a plant species different from the target plant, said flanking sequences being conserved in all higher plants and complementary to the corresponding chloroplast sequences of the target plant, which flanking sequences are also competent to undergo homologous recombination with said complementary sequences of the target plant which are homologous to a spacer sequence of the target chloroplast genome, which sequence is conserved in the chloroplast genome of different plant species, whereby stable integration of the heterologous coding sequence into the chloroplast genome of the target plant is facilitated through homologous recombination of the flanking sequences with the homologous sequences in the target chloroplast genome, and wherein said stable integration is directed into a transcriptionally active polycistronic spacer region of the chloroplast genome.

197. (Twice Amended) A process for stably transforming higher target plant species which comprises introducing a universal integration and expression vector into the chloroplast genome of the target plant species and allowing the transformed plant to grow, the vector being competent for stably transforming the chloroplast genome of higher plant species which comprises an expression cassette which comprises, operably joined, a heterologous DNA sequence coding for a peptide of interest and control sequences positioned upstream from the 5' and downstream from the 3' ends of the coding sequence to provide expression of the coding sequence in the chloroplast genome of a target higher plant, and flanking each side of the expression cassette, flanking DNA sequences which originate from a plant species different from the target plant, said flanking sequences being conserved in all higher plants and complementary to the corresponding chloroplast sequences of the target plant, which flanking sequences are also competent to undergo homologous recombination with said complementary sequences of the

target plant which are homologous to a spacer sequence of the target chloroplast genome, which sequence is conserved in the chloroplast genome of different plant species, whereby stable integration of the heterologous coding sequence is facilitated through homologous recombination of the flanking sequences with the homologous sequences in the target chloroplast genome into a transcriptionally active polycistronic spacer region of the chloroplast genome of the target plant.

198. (Twice Amended) A process for stably transforming higher target plant species which comprises introducing a universal integration and expression vector into the chloroplast genome of the target plant species and allowing the transformed plant to grow, the vector being competent for stably transforming the chloroplast genome of higher plant species which comprises an expression cassette which comprises, operably joined, a heterologous DNA sequence coding for a peptide of interest and control sequences positioned upstream from the 5' and downstream from the 3' ends of the coding sequence to provide expression of the coding sequence including a transcription termination region in the chloroplast genome of a target higher plant, and flanking each side of the expression cassette, flanking DNA sequences which originate from a plant species different from the target plant, said flanking sequences being conserved in all higher plants and complementary to the corresponding chloroplast sequences of the target plant, which flanking sequences are also competent to undergo homologous recombination with said complementary sequences of the target plant and which are homologous to a spacer sequence of the target chloroplast genome, which sequence is conserved in the chloroplast genome of different plant species, whereby stable integration of the heterologous coding sequence [into the chloroplast <sup>redundant</sup> genome of the target plant] is facilitated through homologous recombination of the flanking sequences with the homologous sequences in a transcriptionally active polycistronic spacer region of the target chloroplast genome.

199. (Twice Amended) A process for stably transforming higher target plant species which comprises introducing a universal integration and expression vector into the chloroplast genome of the target plant species and allowing the transformed plant to grow, the vector being competent for stably transforming the chloroplast genome of higher plant species which comprises an expression cassette which comprises, operably joined, a heterologous DNA sequence coding for a peptide of interest and control sequences positioned upstream from the 5' and downstream from the 3' ends of the coding sequence to provide expression of the coding sequence in the chloroplast genome of a target higher plant, and flanking each side of the expression cassette, flanking DNA sequences which originate from a plant species different from the target plant, said flanking sequences being conserved in all higher plants and complementary to the corresponding chloroplast sequences of the target plant, which flanking sequences are also competent to undergo homologous recombination with said complementary sequences of the target plant which are homologous to a spacer sequence in a transcriptionally active polycistronic region of the target chloroplast genome, which sequence is conserved in the chloroplast genome of different plant species, whereby stable integration of the heterologous coding sequence into the chloroplast genome of the target plant is facilitated through homologous recombination of the flanking sequences with the homologous sequences in the target chloroplast genome and the vector does not include a transposon.